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WAYS TO CLEAR WORTHLESS BRUSH FOR PASTURE USE

There's no shortage of total permanent pasture in the state to meet current production needs. But individual farm operators sometimes wish to convert a particular area or tract of brushland to pasture. How can this be done?

by H. D. Hughes, J. M. Scholl, E. P. Sylwester and Floyd Ransom

YOU CAN SEE vigorous stands of orchardgrass and birdsfoot trefoil on areas that once were overgrown with brush and tree seedlings at the Albia Research Farm in Monroe County. The conversion from brush to grass pasture was made with a minimum of cash expense by using only available farm equipment and labor and by doing the work in "slack" times.

Most of a 50-acre tract, from which a scattered growth of trees had been removed some 20 years earlier, had become covered with brush and sprouts. The thorny growth was so thick that animals wouldn't go in to hunt what little grass there was. The tract gave practically no returns.

Some 5 million acres of Iowa's farm land is in permanent pasture, but more than 1½ million have some brush and tree cover. Obviously, 1½ million additional acres of productive pasture certainly aren't needed to meet current production needs. But individual farm operators, for various reasons, find it desirable to convert a particular area or areas of brushland to improved pasture.

The problem in these instances is how, at minimum cost, to get the job done effectively. Our work and experience at the Albia Research Farm may be helpful in these cases. Remember, however, that a brush area can't be cleared and improved without cost and that the cost should be weighed against the value to you of improving a particular brush area.

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The Methods Used . . .

We selected four 1-acre test areas on the 50-acre tract from which to determine the best methods of clearing and seeding. The kinds and sizes of brush and tree growth in each area were then determined and recorded. We also kept a record of the kinds of equipment and the amount of labor used per acre in renovation (see table). The information from the four test areas can be helpful as a guide for land owners who want to clear and improve similar brush-covered areas.

Area 1 ***(sparse brush, grass present, limited grazing)*** was representative of the relatively few spots with a fair stand and growth of grass. Also, the brush wasn't thick enough to prevent grazing animals from getting to the grass. There was a medium-thick growth of pasture weeds, both annual and perennial. The brush growth, mostly buck brush with a scattering of wild blackberry, occupied 16 percent of the area. The kind and number of shrubs and trees per acre are shown in the table.

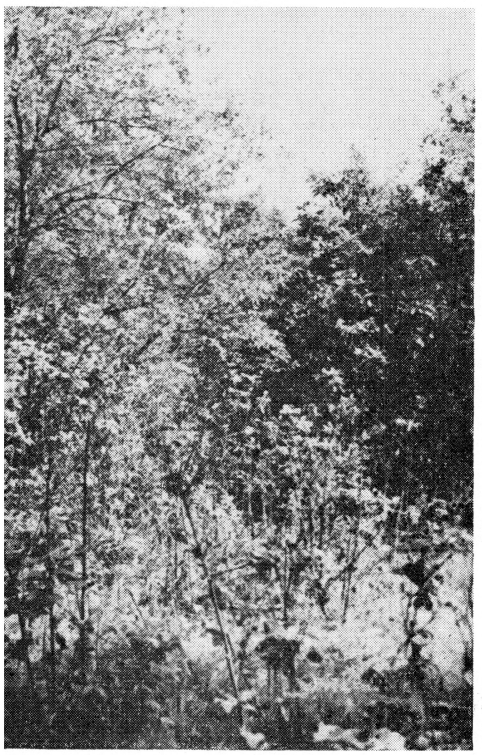
The brush and trees were removed in the winter of 1954-55, and bluegrass now provides good grazing. The sprouts and weeds that appeared in 1955 and in 1956 were controlled by one mowing in each of the two seasons.

Area 2 ***(dense brush, trees, no grazing)*** in the 50-acre tract was so covered with brush, shrubs and trees that animals could get to only a small part of the area. This condition was representative of a large part of the 50 acres. There was very little grass. The brush was vigorous and covered 23 percent of the area. The rest of the area was covered with a thick growth of tree seedlings and some trees.

The trees were cut at the soil surface, and the area was plowed in the fall of 1954. Plowing was slow, with a good deal of stopping. Much of the brush growth that couldn't be turned under was plowed out and pushed into burning piles with a tractor-mounted manure-loader.

The soil was of low fertility, and 300 pounds per acre of 0-20-0 fertilizer were drilled in. Six pounds per acre of birdsfoot trefoil were seeded in April 1955. With continued grazing, volunteer bluegrass has become established in the trefoil, and a thick grass cover now prevails.

Area 3 ***(regrowth present, sparse brush and grass, limited grazing):*** At some time in the past



Area 4 in the fall of 1954 with brush and tree growth so dense that there was little grass available to animals.

this area of the 50-acre tract had been covered with a heavy growth of trees. These had been removed, leaving a fairly uniform distribution of buck brush and hazel brush and some wild blackberry. The brush growth wasn't as vigorous or thick as in some other parts of the tract. Grass growth was fairly uniform but sparse.

The number of plow-under trees and shrubs isn't shown in the table. These trees and other brush were shredded with a rotary mower in the fall of 1954. The larger trees also were cut and removed at that time. After clearing, the sprouts were controlled on half of the area by mowing once in each of the first 2 years and, on the other half, by spraying with a herbicide.

Area 4 (regrowth present, dense brush and trees, no grazing) was covered with a thick growth of brush and small trees, so vigorous that there was practically no grass. Originally, this area of the tract had a heavy cover of trees; the remains of many rotting logs and stumps had to be removed.

After the trees had been cut at the ground surface and removed, the seedlings and brush were shredded with a rotary mower in the late fall and moved to burning piles with a tractor manure-loader. Fertilizer was applied according to a soil test. Since there was little or no grass cover, a seeding of orchardgrass and trefoil was drilled, with almost no seedbed preparation, in April 1955.

A satisfactory stand was obtained, but — because a mower wasn't available for controlling the thick, vigorous regrowth of sprouts and weeds — the grass-legume seeding was smothered and lost. Such a result is to be expected if regrowth isn't controlled. To have used a herbicide spray, however, would have killed the birdsfoot in the seeding. Orchardgrass and birdsfoot trefoil were established later on parts of this area after first killing the volunteer bluegrass with a chemical spray.

Clearing Practices . . .

The information gained in clearing the four 1-acre test areas was used in clearing most of the remaining portions of the 50-acre tract. A large part of the tract has been fertilized and seeded to birdsfoot trefoil and orchardgrass. Six pounds of Empire birdsfoot and 3 pounds of orchardgrass were seeded per acre.

With the tractor equipment available on most farms, brush and many tree seedlings can be plowed under. Many gooseberry bushes, hawthorns and tree seedlings too large to plow under can be plowed out. By using a tractor mounted manure-loader, the brush and tree seedlings can then be pushed to or picked up and transported to burning piles.

Under most conditions, however, it may be more feasible to prepare a seedbed without plowing. This can be done with a disk or springtooth implement. Where the brush cover is so heavy that there's little grass sod, a satisfactory seedbed can be prepared with relatively little working of the surface, especially if the seed and fertilizer are drilled in. If the seed is to be broadcast, it's usually best to disk the area first and to cover the seed lightly, such as with the use of a smoothing harrow.

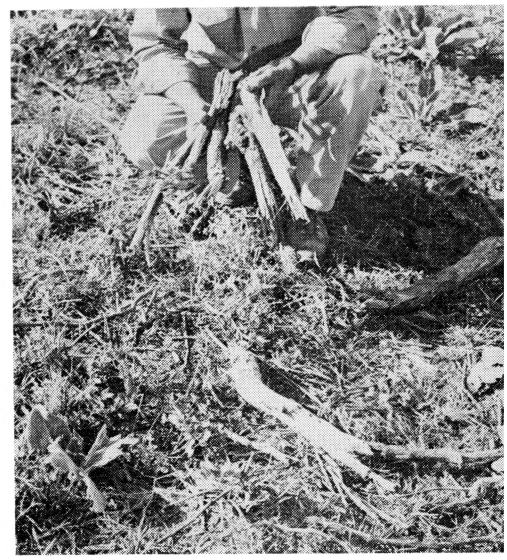
Area 4 in the spring of 1955 after trees had been cut with a chain saw and brush and seedlings with a rotary mower. The stubble shows the vigor and thickness of the brush cover.

A heavy-duty rotary mower is ideal for cutting and shredding all kinds of brush and tree seedlings. Most rotary mowers can cut tree seedlings and sprouts up to 2 inches in diameter and up to 6-8 feet in height. Heavy growths of brush and tree seedlings can be shredded in a once-over operation with the tractor run in low gear.

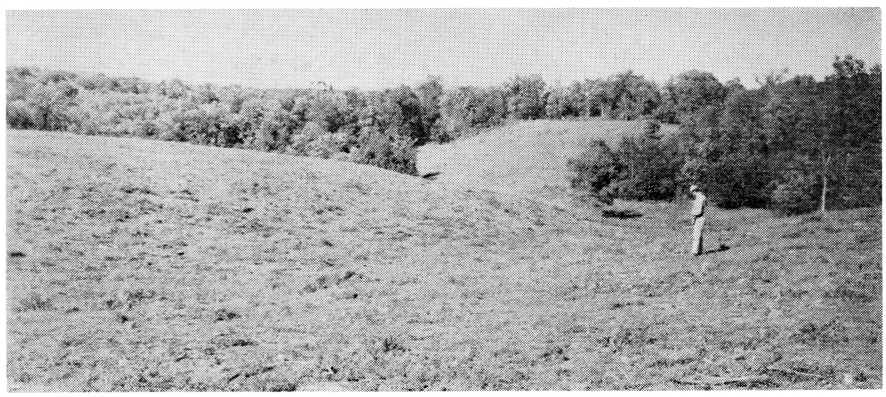
Trees too large to permit shredding or plowing out, but not so large as to require sawing at the ground surface, can be pushed or pulled out with a tractor and chain. Larger trees can be cut at or near the soil surface with a chain saw. It's important to cut the trees low enough to permit equipment to pass over the stumps.

Sprout control after clearing is essential. When brush and trees are cut at the ground surface, a brush cover will soon re-establish unless the sprouts are controlled from the very first. Controlling regrowth can be done rather easily, however, by mowing with a rotary or a heavy-duty cutter-bar mower once or twice a year for the first year or two following clearing. If a legume hasn't been established on the newly cleared area, brush sprouts can be controlled by herbicide spraying.

A chain saw is necessary equipment for cutting trees close to the soil surface so that a disk and fertilizing and seeding machinery can pass over stumps.



Size of the tree seedlings shredded in the fall of 1954 is shown by these pieces left on the surface, fall 1956.



This area was cleared in the fall and winter of 1955-56, then fertilized and seeded early in 1956 with 6 pounds per acre of Empire birdsfoot trefoil and 3 pounds per acre of orchardgrass. The result was a good stand and growth in spite of rather severe drouth conditions.

Herbicides . . .

On the 50-acre tract, most of the brush and tree growth was destroyed by cutting. A chemical herbicide was used only to a limited extent but was effective in killing both brush and trees.

When a rotary mower isn't available, the brush and tree growth can be killed by spraying. Spray until the brush is well moistened with 1 gallon of "brush killer" (a 50-50 mixture of 2,4-D and 2,4,5-T) per 100 gallons of water. If low-gallonage nozzles are used on a spray outfit, add household detergent at the rate of 1 pint of liquid detergent, or 1 pound of dry detergent, per 50 gallons of spray material. The detergent increases the wetting action of the spray and gives better penetration and kill. A good spray coverage can be expected to kill 90-95 percent of the brush and trees. Spraying about the last two weeks in June or the first two in July is recommended.

Trees too large to be killed by foliage spraying in midsummer can be killed by thoroughly wetting the bottom 15 inches of the trunks with a 50-50 mixture of 2,4-D and 2,4,5-T. Mix 1 pint of each herbicide per 5 gallons of fuel oil. Brush or spray enough on so that some of the solution runs into the ground. This treatment is best made when the leaves are off the trees. This procedure is effective in killing tree growth, but the dead material still must be removed.

The fuel oil-brush killer mixture can be used effectively on stumps of freshly cut trees to prevent sprouting. Apply on a warm, sunny day when the bark is dry.

Establishing Pasture . . .

Newly cleared areas usually have little cover of grass or weed growth, so conditions are favorable for fertilizing and seeding a legume-grass mixture with a minimum of expense for seedbed preparation. When the brush growth has been less dense and some sod is present, however, it's desirable to fit a seedbed by disking or with the use of a springtooth implement. The seedbed should be prepared and the legume and grass seeded early in the spring immediately after winter clearing. If seeding is delayed, volunteer grass sod will interfere with legume establishment.

Fertilizing with superphosphate at the time of seeding usually increases the productivity of a newly established pasture. A soil test, and fertilizing in accordance with the results, is always advisable.

Costs, Returns Vary . . .

Actual costs of clearing areas of brushland will vary greatly from farm to farm and from area to area, depending on the density and type of cover and the equipment and labor available. Also, if you have a pulpwood market available, you may be able to market trees 3-20 inches in diameter as pulpwood (see "Pulpwood — A New Market for Iowa Trees" in the October 1962 issue or reprint FS-990).

Cost estimates have little meaning without an inventory of brush density and type of cover. Useful cost calculations can be made, however, on the basis of labor and equipment records reported in the table. The number of man-hours of labor shown is the *minimum*. The men worked purposefully and with vigor. There was no waste of time.

The clearing was done with regularly employed farm help during the fall and winter months. And the work was fitted in with the feeding and care of the farm livestock, as would be done on most farms.

Before being cleared, the test areas had been producing almost no grass. Other unimproved pasture areas on this farm, without brush, have been producing an average of about 100 pounds of beef gain per acre. Adjoining brushless areas renovated with birdsfoot trefoil have averaged from 200 to 260 pounds of beef production per acre, without feeding grain to the animals. We believe that the cleared and trefoil-renovated areas will average as good production as the brushless, trefoil-renovated areas.

Pointers . . .

Here's a summary of tips for converting brushland to productive pasture:

- *To eradicate brush and tree seedlings,* the rotary mower, a relatively new farm implement, is particularly effective. A tractor-mounted manure loader can be used effectively in transporting brush and tree waste to burning piles.
- *Tree seedlings too large for shredding* with a rotary mower are best removed by pulling or pushing out with a farm tractor. Trees too large to be removed with a farm tractor should be sawed close to the soil surface so that the stumps won't interfere with fertilizing and seeding equipment. The one-man chain saw is essential equipment if the labor cost is to be kept to a minimum.
- *In establishing pasture on brush-cleared land,* it's usually advisable to apply superphosphate at the time of seeding. Fertilization should be based on representative soil tests.
- *If some grass sod is present,* best results are obtained if a seedbed is prepared with a disk or spring-tooth implement. The use of a drill for fertilizing and seeding has some advantages. If seed is broadcast, it's desirable to cover it by harrowing or light disking.
- *Seed in early spring* immediately following the brush clearing—and before a growth of other cover has developed. Empire birdsfoot trefoil and orchardgrass are well suited to pasture improvement in southern Iowa. Use 6 pounds per acre of trefoil and 3 of orchardgrass.
- *From the very first,* control the sprouts that appear after brush-clearing. This can be done by mowing or shredding once or twice in the first year or two, as conditions indicate.

Description of brushland test areas and labor and equipment used per acre to clear, seed and control sprouts, Albia Research Farm, Monroe County, Iowa

Description of test areas	Clearing operations performed per acre	Equipment used	Man hours per acre
Area 1. Sparse brush and tree growth, 70 percent grass cover.	111 shrubs plow under size and 26 shrubs and trees plow out size shredded with rotary mower, 38 trees pulled or pushed out, 6 trees (6"-18" diam.) cut, 48 stumps and 14 logs from previous cutting were removed.	**1954** — Tractor and chain	3
		Chain saw	1
		Tractor	3
		Tractor and manure loader	7.5
		1955 — Tractor and rotary mower	1
		1956 — Tractor and rotary mower	1
Area 2. Heavy growth of brush, shrubs and trees over most of the area — 23 percent covered with vigorous brush, almost no grazing.	73 shrubs plowed under, 546 shrubs and small trees plowed out, 98 trees pushed or pulled out, 28 trees chain sawed, 65 stumps and 31 logs remaining from previous clearing operations were removed.	**1954** — Man and ax	5
		Two tractors, two plows	4
		1955 — Tractor and plow	9
		Piling and burning brush, preparing seedbed and seeding to birdsfoot trefoil	14
		1956 — Tractor and cutter-bar mower	1
		Tractor and rotary mower	1
Area 3. Brush growth rather uniform, but not dense enough to exclude grass; 20 percent open grazing, but grass thin and unproductive.	Plow-under size trees and brush cut with rotary mower, 111 trees and shrubs of plow-out size cut with handax, 149 push- or pull-out size trees cut with hand ax, 21 trees sawed at ground surface in fall of 1954.	**1954** — Ax, cutting trees	6.7
		Ax, piling and burnings	3
		Tractor and rotary mower	3
		Chain saw, cutting trees	3
		1955 — Tractor, clearing up	3
		Rotary mower (half of area)	1
		Herbicide spray (half of area)	1
		1956 — Same as in 1955	3
Area 4. Steep southwest slope; practically no grass because of very thick, vigorous growth of brush and tree seedlings.	Brush and 19 shrubs of plow-out size were shredded with rotary mower, 60 trees were chain sawed (many of these were sprouts from oak stumps, or were too big to pull out), 72 logs and 22 stumps from previous clearing were removed.	**1954** — Chain saw	2
		Tractor and rotary mower	4
		Truck	1
		Clearing and burning	15
		1955 — Tractor and seeder	1
		Cyclone seeder	0.5
		Tractor and disk	0.5
		1956 — Tractor and sprayer	1
		Tractor and rotary mower	1